

A RADIATION TRANSFER BASED MODEL FOR ANALYZING THE EFFECTS OF IRRADIATION ON HUMAN SKIN IN LASER TREATMENTS

T.Kono^{1*}, N. Ogawa¹, R. U. Maheswari¹, H. Gonome², J. Yamada¹

¹Shibaura Institute of Technology, 3-7-5 Toyosu, Koto-ku, Tokyo 135-8548, Japan

²Yamagata University, 4-3-16 Jonan, Yonezawa, Yamagata 992-8510, Japan

ABSTRACT. With the advent of the development of sophisticated laser treatment equipments for skin problems, medical accidents are also on the rise. To reduce such accidents, it becomes necessary to understand the basic principles behind the interaction of laser beam and skin. However, because of the complexity of skin, studies dealing modelling of the effects of laser treatment are limited. Therefore, in this study, we propose a new model with skin modelled as discretely interspersed melanosomes and the laser treatment assumed to have the effect of locally increasing the temperature of individual melanosomes. Based on our analysis, for darker pigmentation where there is higher density of number of melanosomes, total absorbed energy becomes higher than that for light pigmentation. But, considering only the absorbed energy per melanosome, the light absorbed becomes higher for light pigmentation. This result implies that treatment parameters should be selected according to the degree of pigmentation.